

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : William A. Skinner et al.
Application No. : 09/603,857
Filed : June 26, 2000
For : DOUBLE FLANGED BUSHINGS AND INSTALLATION
METHODS

Examiner : Steven Blount
Art Unit : 2661
Docket No. : 320043.427
Date : August 23, 2004

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF LEONARD F. REID
PURSUANT TO 37 CFR 1.132

I, Leonard F. Reid, declare as follows:

1. I, Leonard F. Reid, am familiar with the subject matter disclosed and claimed in U.S. Patent Application No. 09/603,857, filed June 26, 2000, and titled "Double Flanged Bushings and Installation Methods" (the '857 Application").

2. I am employed by Fatigue Technology Inc. as Vice President, Research and Development.

3. In addition, my educational and professional background includes: Master of Science Degree in Aircraft Design from College of Aeronautics, Cranfield, England; Diploma of Aeronautical Engineering, Royal Melbourne Institute of Technology, Australia; 25 years' experience as an aeronautical engineer in the Royal Australian Air Force and 17 years in senior engineering positions at Fatigue Technology Inc.; professional membership in Royal Aeronautical Society (RAeS), American Institute

of Aeronautics and Astronautics (AIAA), Society of Automotive Engineers (SAE), American Society of Materials International (ASM), Aerospace Advisory Board Member of TUV America; author of numerous technical papers and dissertations presented internationally on aircraft structure, metal fatigue, railroads and industry-related conferences.

4. I have reviewed the Office Action dated May 18, 2004, including the prior art references and the rejections contained therein.

5. I am one of the inventors of U.S. Patent No. 5,103,548 (the '548 patent) and I am familiar with the contents of the '548 patent.

6. The '548 patent teaches the installation of a single bushing in a work member via a disposable sleeve 16.

7. As currently understood in the art, a bushing remains fixed with the assembly after installation to provide a bearing surface. As taught by the '548 patent, the sleeve is removed from the assembly after installation and hence is not available to serve as a bearing surface. Thus, the sleeve taught by the '548 patent is not a bushing and does not function as a bushing.

8. I have reviewed and understood the teachings of Gänstein, European Patent No. 891007, ("Gänstein"). I have also reviewed and understood the figures of the German Utility Patent 8901317 U1 (the "German patent") referenced in Gänstein. See Gänstein, page 1, ¶ 2.

9. The German patent teaches the installation of a single bushing 1 having a first initial flange 5 into a bore 10 in a rail 4 by axially and radially displacing bushing material. An expansion mandrel 15 is used to radially expand some of the bushing material into the rail 4, while other bushing material is axially and radially displaced slightly outward beyond the rim of the bore 10 in the rail 4 to form a second flange (Figure 3) on the opposite side of the rail 4 from the first flange 5. A bushing cap 23 having a hollowed out region 24 is then installed over the second flange.

10. The German patent teaches that the bushing material, which is displaced beyond the rim of the bore 10 to form the second flange, provides the bushing assembly with some amount of axial (*i.e.*, translational) fixity with respect to the rail while some amount of rotational fixity is obtained between the bushing 1 and the rail 4 in response to radial expansion by the mandrel 15. The bushing cap 23 is affixed to the entire assembly with a threaded bolt 20a and nut 21.

11. Figures 1-3 of Gänlein illustrate two nested bushings 1,2 installed in a rail web 9. A comparison of Figure 2 with Figure 3 shows that the thickness of the inner bushing 1 is reduced while the thickness of the outer bushing 2 does not change in response to the drawing of the expansion mandrel 11. The lack of change in the thickness of the outer bushing 2 leads to the conclusion that the outer bushing 2 in Gänlein is not radially expanded to form an interference fit with the rail web 9, and hence is not rotationally fixed with respect to the rail web 9.

12. With respect to the assembly of the inner bushing 1 with the outer bushing 2, Gänlein teaches that the inner bushing 1 is rotationally fixed with respect to the outer bushing 2 due to the radial expansion of the inner bushing 1 by the mandrel 11. In addition, Gänlein teaches that the inner bushing 1 is translationally fixed with respect to the outer bushing 2 due to the extrusion of material from the inner bushing 1 into the turned-out hollow 14 formed in the outer bushing 2 (Figure 3). Gänlein also suggests that a threaded bolt 17 can be provided to clamp the bushings onto the rail web 9 (Figure 4).

13. With respect to the assembly of the outer bushing 2 with the rail web 9, Gänlein teaches that the outer bushing 1 is not rotationally fixed with respect to the rail web 9 because the outer bushing 2 is not radially expanded at any time during the installation process. The only fixity existing between the outer bushing 2 and the rail web 9 as taught by Gänlein is translationally fixed due to the opposing flanges 4,6 working in combination with the extrusion of material from the inner bushing 1 into the turned-out hollow 14 formed in the outer bushing 2.

14. Although the bushing configuration suggested in Gänslin may be acceptable for bushings installed into rail tracks, the configuration taught in Gänslin would be inappropriate in an aerospace application because rotational fixity between an outer bushing and a work member is necessary and highly desirable in aerospace applications. However, Gänslin does not teach or even suggest that rotational fixity can be obtained between an outer bushing and a work member when a dual bushing assembly is utilized.

I hereby declare that all statements made herein are, to my own knowledge, true and that all statements made on information or belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the captioned patent application or any patent issued therefrom.

Date: September 9, 2004



Leonard F. Reid

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